

REMARKS

Claims 1-7, 9-10, 12-14, and 17-19 are currently pending. Claims 1 and 10 have been amended to more clearly set forth the subject matter of the invention and to include the subject matter of original claims 8 and 11, respectively, which have been canceled. The amendments to claims 1 and 10 are supported in the specification at p. 8, line 5, and p. 9, lines 7-24. Claims 12 and 13 have been amended to correct dependency from a canceled claim. Claims 15 and 16 which were previously withdrawn have been canceled. Applicants retain the right to prosecute these claims in a divisional or continuation application.

SECTION 112

Claims 1-14 and 17-19 have been rejected under 35 U.S.C. §112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regard as the invention.

With respect to claim 1, the Examiner has asserted that the term "may be" renders the claims indefinite. Applicants respectfully submit that this rejection is obviated by the amendment of claim 1. Specifically, the phrase "may be" has been deleted.

The Examiner has also rejection claims 1, 7, 10, and 18 under Section 112 alleging that based on the claimed mole percent quantity of urea units, "it is unclear if the percent quantity is based on the total moles of polymer or some other entity." This rejection is respectfully traversed. Claim 1 (with similar provisions in claims 7, 10, and 18) states that "the urea/urethane polymer contains less than about 2 mole percent of urea units described by the formula $-R - N(R^2) - C(O) - N(R^2) - R^1 -$." The urea units have been described as a component of the urea/urethane polymer. As such it is clear that the basis for the 2 mole percent limitation is based on the urea/urethane polymer. There is no other entity which could serve as the basis for this comparison. Therefore, reconsideration and withdrawal of the rejection of claims 1, 7, 10, and 18 are appropriate and respectfully requested.

DOUBLE PATENTING

Claims 1-14 and 17-19 have been provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-19 of copending application No. 10/700,857. Applicants will consider the timely filing of a terminal disclaimer upon a finding of allowable subject matter.

SECTION 102

Claims 1-8, 10-14, 17 and 18 have been rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,008,325 to Soto et al. ("Soto"), similarly, claims 1-8, 10-14, 17 and 18 have been rejected as being anticipated by U.S. Patent No. 5,037,864 to Anand et al. ("Anand"), claims 1-3, 5 and 7 have been rejected as being anticipated by U.S. Patent No. 3,404,131 to Taub et al. ("Taub"), claims 1-3, 5 and 7 have been rejected as anticipated by U.S. Patent No. 4,071,492 to Bethea et al. ("Bethea"), claims 1-7 have been rejected as anticipated by U.S. Patent No. 3,425,999 to Axelrood et al. ("Axelrood"), claims 1-7 have been rejected as anticipated by U.S. Patent No. 4,383,100 to Pechhold ("Pechhold I"), claims 1-7 have been rejected as anticipated by U.S. Patent No. 4,476,293 to Robinson ("Robinson"), and claims 1-7 have been rejected as anticipated by U.S. Patent No. 5,035,893 to Shioya et al. ("Shioya"). Each of these rejections will be addressed below

Claim 1 as amended includes a urea/urethane polymer including (a) repeating units derived from a hydroxy-terminated copolymer prepared from tetrahydrofuran and one or both of an alkylene oxide and a cyclic acetal, and (b) repeating units derived from a polyisocyanate. The urea/urethane polymer contains less than about 2 mole percent of urea units described by the formula $-R - N(R^2) - C(O) - N(R^2) - R^1 -$; where R is an aromatic hydrocarbon radical, R^1 is an aliphatic hydrocarbon radical, and R^2 is H or an amide group that is described by the formula $-C(O) - N(R^2) - R -$. The urea/urethane polymer of claim 1 also includes an aromatic polyisocyanate. The urea/urethane polymer also includes repeating units derived from an ionic compound or a potentially ionic compound and is substantially free of polyamine chain extenders.

The urea/urethane polymer of claim 1 is useful in an aqueous dispersion given its ionomeric nature and may be used to prepare thin walled articles such as gloves that will have direct contact with a wearer's skin. Of particular importance, the urea/urethane polymer will only include the urea component where R^1 is aliphatic when (1) an aliphatic polyamine is used as a chain extender or (2) water is used as a chain extender with an aliphatic isocyanate. Polyamine chain extenders are avoided in the present invention due to the wearer contact end uses where polyamines can cause skin irritations.

Also of importance to note is that the present invention includes an aromatic polyisocyanate. Aromatic polyisocyanates were previously avoided in the preparation of polyurethane dispersion due to the belief that the use of aliphatic isocyanates was thought to

have higher stability toward hydrolysis while the prepolymer is dispersed in water. It was generally believed that, in such a situation, a chain-extending reaction between an isocyanate and a polyamine takes place in a more controlled and predictable manner.

Soto

Claims 1-8, 10-14, 17 and 18 have been rejected under 35 U.S.C. §102(b) as anticipated by Soto. Applicants respectfully submit that the amendment of claims 1 and 10 obviates these rejections.

Soto is directed to polyurethane-urea resins with incorporated hydrophobic microparticle fillers. The polyurethane-urea is prepared in a dispersion and includes ionic groups, a polyol, a polyisocyanate and a chain extender. The polyols, polyisocyanates, and chain extenders are broadly disclosed with several examples and some guidance with respect to the preferred embodiments. Within the extensive disclosure, Soto includes copolymers of tetrahydrofuran and ethylene oxide, aromatic diisocyanates, and water or polyamines as chain extenders. Soto provides no disclosure, teaching or suggestion as to the element limiting the urea units to less than about 2 mole percent of a group having R¹ as an aliphatic hydrocarbon radical. Soto also fails to disclose a polymer substantially free of polyamine chain extenders.

The Examiner has stated at page 5 that Soto "is considered to be anticipatory for the rejected claims in view of the cited preferred teachings." However, the preferred teachings of Soto are outside the scope of claim 1. For example, Soto's preferred polyol includes a blend of a copolymer with an additional copolymer. Column 6, lines 16-21. By contrast, the present invention includes a copolymer of tetrahydrofuran and one or both of an alkylene oxide and a cyclic acetal. Soto's preferred polyisocyanate includes an aliphatic or cycloaliphatic hydrocarbon group, column 7, lines 45-46, while claim 1 as amended requires the inclusion of an aromatic polyisocyanate. Soto's preferred chain extender is either water or a polyamine, with primary alkylene diamines being "preferred as a class." Column 10, lines 36-43.

If one were to follow the preferred teachings of Soto, a polyol blend would be included with an aliphatic or cycloaliphatic polyisocyanate, and a chain extender including either water or a primary alkylene diamine. No preference is stated between water and the diamine for the chain extender, however, the only examples in Soto are directed to the use of ethylene diamine as a chain extender. The use of any diamine chain extender would place

the embodiment outside the scope of the present claims. However, even if water was used as a chain extender with Soto's preferred aliphatic or cycloaliphatic polyisocyanates, the present claims would still be avoided.

Given that Soto fails to disclose every element of the present claims, including the preparation of a polymer substantially free of diamine chain extenders and the limitation of the urea groups which include R^1 as an aliphatic hydrocarbon radical, Soto fails as a proper anticipatory reference with respect to the present claims. Therefore, reconsideration and withdrawal of the rejections under Section 102 in view of Soto are respectfully requested

Anand

Claims 1-8, 10-14 and 17-18 have been rejected under 35 U.S.C. §102(b) as anticipated by Anand. Applicants respectfully submit that the amendment of claims 1 and 10 obviates these rejections.

Anand fails to disclose every element of the claims as amended. Specifically, Anand fails to disclose the preparation of a polymer substantially free of diamine chain extenders and the limitation of the urea groups which include R^1 as an aliphatic hydrocarbon radical.

The Examiner has stated at page 6 that Anand "is considered to be anticipatory for the rejected claims in view of the cited preferred teachings." However, the preferred teachings of Anand are outside the scope of claim 1. For example, Anand's "preferred diols comprise the preferred random and block polyether diols and polytetramethylene glycols... with polyethyleneoxy-capped polypropyleneoxy diols being most specifically preferred." The Examiner has alleged that the copolymer of tetrahydrofuran and alkylene oxide or cyclic acetal of the present invention is within Anand's preferred polyols. Applicants respectfully disagree given that the tetramethylene glycol is not described by Anand as being included in Anand's preferred random and block polyether diols. In other words, tetramethylene copolymers are not preferred by Anand.

With respect to Anand's preferred polyisocyanate, it is clear that aromatic polyisocyanates should not be used alone, but only in combination with aliphatic or cycloaliphatic polyisocyanates. Column 7, lines 54-57. Even if the urea/urethane polymer of Anand is chain extended with water, the aliphatic groups present would alone likely place Anand's polymer outside the scope of claim 1.

Furthermore, Anand states that "the preferred chain extenders are... hydrocarbon polyamines." Column 13, lines 30-31. In addition, the mechanism as described in FIGS. 1-3 at column 16, lines 20-22 and 51-54, and at column 17, lines 53-55, provides for the addition of chain extender after the dispersion of the prepolymer in water. If water was the chain extender, the addition would not be necessary which emphasizes that the addition of polyamine is preferred. Anand provides no example of chain extending the prepolymer with water. The use of a polyamine chain extender also fails to anticipate present claim 1.

Given that Anand fails to disclose every element of the present claims, including the preparation of a polymer substantially free of diamine chain extenders and the limitation of the urea groups which include R^1 as an aliphatic hydrocarbon radical, Anand fails as a proper anticipatory reference with respect to the present claims. Therefore, reconsideration and withdrawal of the rejections under Section 102 in view of Anand are respectfully requested.

Taub, Bethea, Axelrood, Pechhold I, Robinson, and Shioya

Applicants respectfully submit that the rejection of claims under Section 102 as anticipated by any one of Taub, Bethea, Axelrood, Pechhold I, Robinson, and Shioya, is obviated by the amendment of claim 1 incorporating the language of claim 8. Claim 8 was not rejected under Section 102 or 103 in view of any of these references for the reason that none of these references discloses a urea/urethane polymer wherein the urethane polymer comprises repeating units derived from an ionic compound or a potentially ionic compound. Therefore, withdrawal of the rejections under Section 102 in view of Taub, Bethea, Axelrood, Pechhold I, Robinson, and Shioya is respectfully requested.

SECTION 103

Claims 9 and 19 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Soto or Anand in view of U.S. Patent No. 3,178,310 to Berger et al. ("Berger"). Applicants respectfully submit that this rejection is obviated by the amendment of claim 1 and 10. Berger has only been cited to show the use of a surfactant in combination with a polyurethane dispersion. However, Berger does not provide any disclosure, teaching or suggestion to overcome the deficiencies of either Soto or Berger in disclosing every element of the claims as amended. Therefore, withdrawal of the rejections of claims 9 and 19 under Section 103 is respectfully requested.

Claims 4 and 6 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Taub in view of U.S. Patent No. 4,120,850 to Pechhold ("Pechhold II") or U.S. Patent

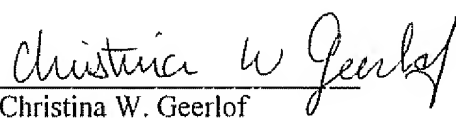
No. 4,139,567 to Pruckmayr ("Pruckmayr"). Applicants respectfully submit that these rejections are obviated by the amendment of claim 1 incorporating the language of claim 8. Claim 8 was not rejected under Section 102 or 103 in view of Taub for the reason that Taub fails to disclose a urea/urethane polymer wherein the urethane polymer comprises repeating units derived from an ionic compound or a potentially ionic compound. Therefore, withdrawal of the rejections of claims 4 and 6 under Section 103 over Taub in view of Pechhold II or Pruckmayr is respectfully requested.

CONCLUSION

For the reasons stated above, claims 1-7, 9-10, 12-14, and 17-19 are believed to be in condition for allowance. Accordingly, Applicants respectfully request that the Application be allowed. If prosecution may be further advanced, the Examiner is invited to telephone the undersigned to discuss this application.

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Respectfully submitted,


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